



# Breaking Bad with the Participatory Turn? Accelerating Time and Intensifying Value in Participatory Experiments

Pierre Delvenne & Hadrien Macq

To cite this article: Pierre Delvenne & Hadrien Macq (2020) Breaking Bad with the Participatory Turn? Accelerating Time and Intensifying Value in Participatory Experiments, *Science as Culture*, 29:2, 245-268, DOI: [10.1080/09505431.2019.1668369](https://doi.org/10.1080/09505431.2019.1668369)

To link to this article: <https://doi.org/10.1080/09505431.2019.1668369>



Published online: 24 Sep 2019.



Submit your article to this journal [↗](#)



Article views: 121



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 1 View citing articles [↗](#)



# Breaking Bad with the Participatory Turn? Accelerating Time and Intensifying Value in Participatory Experiments

Pierre Delvenne and Hadrien Macq

SPIRAL Research Centre, University of Liège, Liège, Belgium

## ABSTRACT

Science and technology studies (STS) scholars have long advocated a ‘participatory turn’ in science, technology and innovation. Decisively informed by STS, participatory experiments across the world have sought to overcome the limitations of technocratic approaches and traditional innovation processes, to allow for new forms of democratic engagement. Yet the interplay between modes of participatory experiments and their wider political-economic ordering is significantly evolving. Alongside traditional deliberative experiments of the so-called ‘participatory turn,’ participation is now also organized in various collective experiments during which technologies are tested, e.g. in ‘living-labs’ or ‘hackathons.’ Currently, participatory experiments are shaped by a double trend of accelerating time and intensifying value; they are now often organized as intense events seeking to extract as much value as possible from participants. This trend indicates a broader shift in the way participatory experiments are imagined, designed and implemented, away from participation in decision-making to participation in innovation-making, as well as a shift from civic values to productivist values with the pervasive expectation that publics should increasingly act as innovators and entrepreneurs. The relative abandonment of democratization warrants STS co-productionist analyses that question the values and objectives of participatory experiments in addition to their formats, issues, and publics.

## KEYWORDS

Participatory experiments;  
living lab; hackathon;  
intensification; acceleration;  
participatory turn

## Introduction

*At the end of the first day of the competition, I left the place at 1 a.m., leaving Michael and Victor working on our project. When I came back at 9 a.m., I was struck by how cold the room was. It was 5°C outdoors and the air conditioner had been working all night long. The first thing my eyes noticed was an inflatable mattress lying on the ground, at the foot of our working table. Seated at this table was Michael, eating a bowl of cereal. He was wrapped up in a blanket and looked tired. He told me that he had been working on our project a good part of the night and that he fell asleep at 5.30 a.m. Victor entered the room with his breakfast. He looked tired too. He told me he fell asleep at 4 a.m.,*

*directly on the floor as he had forgotten his mattress. Both urged me to have a quick breakfast because we had to get back to work.*

Extract from field notes, March 2018.



Michael having a quick breakfast, wrapped up in a blanket. On the ground, the mattress he slept three hours on.

Picture credit: H. Macq, 2018.

The scene described above was taken from participant observation that one author conducted during the Citizens of Wallonia Hackathon, held in March 2017 in Mons, Belgium. As described in more detail in this paper, the event consisted of a 48-hour competition in which teams were meant to design a technological innovation to meet the challenges of the so-called 'Smart City.' In introducing the event, the organizers insisted on the speed that characterized the competition and stressed that the participants had to give the best of themselves. Beyond this particular example, we argue that there is a significant shift in the design and implementation of participatory experiments more generally.

The shift warrants inquiry: How do recent participatory experiments construct and perform value? By what agency do political-economic dimensions enter such experiments? In what sense are they experiments, i.e. testing some uncertainties and outcomes? As argued in this paper, the recent shift has the effect of accelerating time and intensifying value; it reflects the ongoing and mutual shaping of participatory experiments with wider political-economic ordering.

While previous STS research on participation has focused on deliberative processes and what has been called the ‘participatory turn’ (Irwin, 2001; Jasanoff, 2003; Wynne, 2006), a new array of participatory experiments increasingly de-emphasize the explicit objectives of democratizing expertise or politicizing technology issues (Chilvers and Kearnes, 2016b; Lezaun *et al.*, 2017). New participatory experiments are indeed invoked and organized in diverse and (possibly) novel ways, both descriptive and normative. We have yet to see critical unpacking of both the concrete implications and the causes that led to this evolution. This paper is an attempt to address that gap. As suggested in the title, we argue that the reconfiguration of participatory experiments might indicate that we have ‘broken bad’ with the participatory turn as it was envisaged by STS scholarship in the early 2000s.

By scrutinizing more recent participatory experiments – such as living-labs or hackathons – and comparing them with traditional deliberative ones, we identify a shift from participation in decision-making to participation in innovation-making (see also Macq *et al.*, [submitted for publication](#)). This shift indicates a relative abandonment of concerns related to democratization and a heightened focus on instrumental (and mostly economic) outcomes. Today participation is subordinated to a broader political-economic agenda characterized by the knowledge economy and concerns with competitiveness, thus constraining the time available for participation and intensifying participatory exercises in order to extract value from participants.

In the following section, we present a co-productionist approach to participatory experiments that we adopted in order to collect and analyse our empirical material. In the empirical sections, we introduce concrete strategies for data collection and analysis and describe three cases: a citizen consultation on sustainable consumption, organized at the European level; the setting up of a living-lab on e-health in Wallonia, Belgium; and a hackathon dedicated to the theme of smart cities, also in Wallonia. We then compare these three cases with four central dimensions of the co-productionist approach to analyse how participatory experiments accelerate time and intensify value. We conclude by examining the implications of such trends for the STS community.

## Co-productionist Approach to Participatory Experiments

In recent years, there has been increasing reference to ‘experiments’ beyond the traditional natural science fields and laboratories, including a range of social and

political experiments that feature prominently in our daily lives. For example, STS scholars have used the vocabulary of experiments in topics as diverse as material engagements with climate change (Marres, 2012), the art of governing nuclear waste (Parotte, 2018), technologies of democracy (Felt and Fochler, 2010; Laurent, 2011, 2016, 2017) or technologies of participation (Bogner, 2012; Voss and Amelung, 2016; Lezaun *et al.*, 2017).

The new turn is demonstrated by the various settings that deploy ‘experimental vocabularies’ and subsequent changes in traditional STS repertoires. It extends beyond the so-called ‘participatory turn’ in science, technology and innovation from the early 2000s (Irwin, 2001; Jasanoff, 2003; Wynne, 2006). In a recent contribution entitled ‘experiments in participation,’ Lezaun *et al.* (2017, pp. 196–197) subtly renamed ‘public engagement in science’ as ‘a long-standing experimental practice.’ Similarly, they refer to ‘participation’ as a sort of ‘experimental intervention.’ The experimental dimension of participation has been linked to its democratic facet, since participatory experiments, considered as ‘democratic experiments,’ involve defining and dealing with public problems (Laurent, 2017, p. xiv).

Laurent (2016) stresses two particularly interesting characteristics of experiments. First, experiments have learning objectives, and thus partially uncertain outcomes as ‘experiments cannot be guaranteed to produce already-known results’ (p. 774). Second, experiments involve various forms of demonstration addressed to specific audiences who are expected to validate, or be convinced by, the outcomes. These two characteristics guided our case selections. While all the cases we chose held value creation as a major outcome, they differed in orientation towards value production and the targets for this production, thus yielding diverse answers to our research questions above.

Our approach to analysing these issues draws on the idiom of co-production. In STS research, co-production is usually used stress the mutual relationships between participatory procedures, involved publics, and the issues to be deliberated (Jasanoff, 2004; Felt and Fochler, 2010; Chilvers and Longhurst, 2016). Scholars consider that ‘invited publics’ do not exist until they become engaged in the situated experiments. Rather, a public comes into being through both the emergence of an issue and the preparatory arrangements for experimentation (Marres, 2005). Chilvers and Longhurst (2016) argue that all forms of participation are emergent phenomena and social experiments in themselves, in which the ‘who’ (identity of participating publics), the ‘how’ (procedural format) and the ‘what’ (issue to be deliberated) are always co-produced through the performance of collective participatory practices.

Drawing on this, Chilvers and Kearnes (2016a, p. 32) develop ‘co-productionist understandings of participation in the making at the level of situated *participatory experiments and practices*’ (our emphasis), which means that participatory experiments are ‘shaped by – and in turn shape – technoscientific, political and social orders’ (p. 32). Despite its contribution to STS analysis of

participatory experiments, this kind of co-productionist approach has yet to critically scrutinize the objectives of participatory experiments. Doing so requires analysing not only the ‘what,’ ‘who’ and ‘how’ of participation, but also the ‘why.’

Felt and Fochler (2010, p. 228) acknowledge that connecting situated participatory events to the political machine at large, in order to make sense of them in a wider context, is an analytically underexposed yet crucial process. The notion of participatory processes as experiments also points to the crucial connection between local experimentations and broader political constellations (Barry, 2001; Lezaun, 2011; Lezaun *et al.*, 2017). A similar claim is made by Jasanoff (2011) and Laurent (2016), who scrutinize participatory experiments to better understand their effects on how democratic life is organized.

Conversely, Goven (2006) highlights the wider political-economic dimensions that affect participatory experiments. More specifically, Thorpe (2010, p. 406) links participation with political transformations associated with Third Way liberalism and new public management to show that, in the UK, public participation could develop as a form of politics suited to post-Fordist conditions, facilitating the emergence of citizen-consumers amenable to the products and services of a knowledge economy. Thorpe argues that participation became a successful concept in science policy because it was seen as a harmless vehicle facilitating the pursuit of economic value in a knowledge economy. Participation was turned into a programme likely to add to, rather than detract from or obfuscate, the economic value of science. Here, publics, often referred to as ‘users’ or ‘consumers,’ are transformed into resources or assets that can generate forms of non-political value.

In the following paragraphs, we use this co-productionist approach to analyse the wider political-economic ordering of these experiments, taking into account the diversity of processes that occur at different sites and different levels, as well as their entanglements (Jasanoff, 2004; Joly, 2015). Such an approach reconnects the *how*, *who*, *what*, and *why* of public participation into a broad framework.

Inspired by Joly (2015), we adopt two methodological principles: heuristic of continuity and variation of analytical scales. To be clear, our objects and cases differ from Joly’s: he focussed on how to govern and evaluate emerging technologies, while our case studies focus on participatory experiments that often have a strong technological component. Thus, we adapt Joly’s two methodological principles to fit our research object. In line with the heuristic of continuity, we not only look at new situations in which participatory experiments are organized, we symmetrically compare the continuities with well-established public participation methodologies and rationales. To vary our scales of analysis, we rely on empirical data collected at both the European and Belgian scales.

In line with recent approaches in both STS (Jasanoff, 2004) and political economy (Sum and Jessop, 2013), this approach to public participation is interpretive and interactionist, as it assumes that realities (such as publics, imaginations or democratic practices and materialities) are a social construction

rather than objective, pre-defined phenomena that can be discovered through empirical testing (Fischer, 2003).

Powerful actors (political or economic) reveal agency by shaping the political and organizational conditions of participation. Meanwhile, participants and organizers exhibit agency by creating and subverting interventions within participatory experiments. Connecting experimental sites with their broader political-economic spaces puts equal emphasis on the agency of participants and organizers as well as powerful actors. We consider that all types of agency can affect, and be affected by, participatory experiments. Nevertheless, particular instruments and public or private initiatives result in asymmetrical allocations of power.

### **Methodological Approach: The Cases, Data Collection, and Analysis**

Our empirical cases are based on our experience organizing and observing participatory experiments over the past seven years. We selected cases that presented a diversity of scales and enabled a comparison of new forms of participation with traditional ones. In addition, in order to capture diversity in the imagination, design, and implementation of participation, we selected participatory experiments showing different formats, issues, publics, and objectives of participation. As noted below, all three cases seek to extract value from participants. Our diverse selection of cases demonstrates three different types of conceptions: the value to be extracted, extraction process, and expected audiences.

Case study 1 is a *citizen consultation* on sustainable consumption organized as part of a European-funded project. We were both involved in this European project (sponsored by the 7th Framework Programme) for its entire duration (2011–2015). As a partner in this project, our task was to organize participatory events and engage the public on several policy issues considered as ‘grand challenges’ for Europe. Our dataset consists of a variety of material: interviews made in the context of the project, numerous notes, records and partial transcriptions of meetings, workshops and conferences, as well as written sources such as the project’s final report, scientific articles, newspaper articles, grey literature, legislative drafts, and so forth.

Case study 2 is the creation of a *living-lab* focused on e-Health, the Walloon e-Health Living Lab (WeLL). One author was invited to join a consortium of experts and subsequently tasked with giving social-scientific theoretical and methodological advice to the coordinators. This living-lab was established in 2015 as part of the Ministry of Economy and Innovation’s policy strategy entitled ‘Creative Wallonia.’ Our dataset consists of notes taken when observing co-creation experiments organized by the WeLL, participatory observation in consortium meetings between February 2015 and June 2017, and official document and website analysis.



Case study 3 is a *hackathon* entitled ‘Citizens of Wallonia,’ organized as part of a public-private partnership. For this case study, one author conducted participant observation in the hackathon as part of their PhD field research. This observation involved joining the competition, like any other participant, for the full duration of the event. While working on a team to develop a project, the researcher took notes about his observations, feelings, and thoughts. Although these field notes are the main data gathered for this case study, they were enhanced by three interviews with the event organizers and two partners, as well as study of grey literature and analysis of event’s promotional material.

All these cases are participatory *experiments* as they combine instrumented action, demonstration, and uncertainty (Laurent 2016). Indeed, they all rely on instruments (the European Wide Views method, the so-called ‘creative methods’ of Living Labs, the material space, devices and coaching provided in the Hackathon). They also call on audiences to prove that the experiment worked. This demonstration is aimed at two types of audiences: internal actors (the participants themselves, who must be convinced that their involvement produces something valuable) and external actors (EU policymakers in the European citizens’ consultation, healthcare professionals in the Living Lab workshop, and both coaches and a business jury in the Hackathon). These various audiences were assembled to demonstrate that the chosen experimental formats were suitable to tackle the issues they were designed to address (to provide insights for better sustainability policies in the citizen consultation and to unleash creativity and innovation potential in the living-lab and the hackathon).

Finally, to a certain extent, each case embraces uncertainty: for example, about scaling up citizens’ opinions to ‘Europe-Wide Views’ in the European citizens’ consultation or about the ability to produce innovative ideas in the Living-lab and the hackathon. However, as we will explain in the discussion, uncertainty largely remains controlled, by virtue of this complex instrumentation and imperative to demonstrate that the experiment works.

In each case, the collected data were transcribed when necessary, and they were analyzed thematically (Braun and Clarke, 2006) along four dimensions: issues, publics, formats, and participation objectives and value. We used NVivo software to transcribe and code the textual material. As we worked through the material, we followed a mixed technique of inductive and deductive reasoning, made of iterative feedback loops between empirical data and theoretical elements. We began with a list of categories and codes derived from our initial co-production analytical framework (‘what,’ ‘how,’ ‘who,’ ‘why’), but integrated additional codes or modified existing ones as we gained deeper knowledge of the empirical cases.

We applied this systematic approach to all available interview transcripts and field notes, sorting the data into these condensed and classified sections to capture the essence of each broader category (Tong *et al.*, 2007; Berg and



Lune, 2011). At the same time, we related the interview data and statements from our participatory observation to the results generated in our ongoing document analysis, which covered press releases and further materials, like websites and presentations from (internal and public) meetings.

### Case 1: European Citizen Consultation on Sustainable Consumption

The first case is the study of a participatory experiment organized in a project funded by the European Commission under the 7th Framework Programme: PACITA (Parliaments and Civil Society in Technology Assessment).<sup>1</sup> Aligned with the deliberative emphasis of the ‘participatory turn’ in STS (e.g. Irwin, 2001; Wynne, 2006), PACITA adopted the narrative of a certain evolution of democratic practices towards more participation: ‘during the 1980s and 1990s in Europe the deliberation model gained importance and can nowadays be regarded as being dominant in many European countries’ (PACITA, 2010, p. 10). Furthermore, and again in terms that many STS scholars would applaud, PACITA considered the ‘participatory’ model of Technology Assessment (TA) as more advanced and responsive compared to the ‘shortcomings of a “technocratic” TA approach’ (PACITA, 2010, p. 12). Therefore, the ‘consultation process towards the public, stakeholders, societal groups and citizens [could] be regarded as the European “improvement” on the classical TA model’ (PACITA, 2010, p. 11).

The underlying idea was that while these democratic practices seemed well entrenched at the national level, they were relatively absent at the European level where the scientific and policy agenda was being reconfigured by a discursive shift from ‘policy problems’ to ‘grand challenges’ for Europe (Kaldewey, 2018). To address these challenges (e.g. aging societies, climate change, competitiveness gap), PACITA partners suggested that it was necessary to scale-up participation practices to the European level. This was the normative base for several participatory experiments undertaken in the framework of PACITA.

One participatory experiment was the cross-European citizen consultation that gave 1100 European citizens the opportunity to deliberate and vote on issues related to one ‘grand challenge for Europe’: sustainable consumption. This major consultation – split into 11 simultaneous national consultations of 100 citizens – was based on a specific method, World Wide Views (WWViews). WWViews had already been used at European and global levels to organize citizens’ consultations on various policy issues, such as global warming or biodiversity (Jørgensen *et al.*, 2016).<sup>2</sup> Intended as a mechanism to represent the views of global citizens in a formal and organized fashion, WWViews combines national face-to-face citizen consultations with a web-based transnational comparison of the national results.

This method was invented in 2009 by the Danish Board of Technology (DBT). Renowned not only for adapting the famous World Wide Views

method, but also for inspiring the scenario workshop method in the 1980s, the DBT enjoys a strong reputation in STS circles. The STS community likewise sees it ‘as one of the pioneers within participatory methods to assess societal impacts of new technologies and develop visions for a more sustainable and democratic future’ (see Michael Jorgensen, arguing against the abolition of the DBT in a note published on the EASST website).<sup>3</sup> As one of the ‘newest addition[s] to the DBT’s suite of participatory methodologies’ (Blue and Medlock, 2014, p. 561), WWViews marks an important innovation scaling-up formal public engagement in response to global issues, transcending the boundaries of nation-states and requiring policy responses at the supranational level (Bedsted *et al.*, 2012).

In order to explain how the method works, we rely on Blue and Medlock’s (2014, pp. 569–570) account that summarizes the WWViews process. First there were preliminary discussions among PACITA partners organized by the DBT. Then, a few weeks prior to the event, each participant received an information booklet (PACITA, 2014) outlining the background information deemed necessary as a starting point for discussion. To ensure consistency across participating regions, the DBT enacted strict criteria for participation (with regards to age, gender, occupation, education, and geographical zone of residency). In addition, the registration form asked each applicant about any existing connection to an environmental association (and citizens responding positively to this question were automatically excluded from the pool of potential participants). While the exercise was framed as a *citizens* consultation, the 100 ‘ordinary’ citizens selected in each participating country were also considered as consumers, whose preferences, habits, and consumption patterns had to be probed. Rather than mere citizens, then, they were considered as ‘citizen-consumer hybrids’ (Johnston, 2008).

To ensure the legitimacy and reliability of the final results, the DBT circulated strict guidelines for organizers, who received a detailed outline of ‘everything that needs to be done before, during, and after the citizen consultation’ (PACITA, Manual for Europe Wide Views on Sustainable Consumption, p. 4). The manual also specified that ‘all citizen consultations will [receive the same background information], have the same agenda and use the same approach in order to make results comparable and useful for policy makers at the European level’ (PACITA, Manual for Europe Wide Views on Sustainable Consumption, p. 2).

On the day of the consultation, four structured thematic sessions were held in which groups of eight to ten participants discussed the key issues under the guidance of a facilitator. A short video was shown at the start of each session to reinforce the material in the information booklet. After a brief discussion, participants were asked to cast votes on multiple-choice questions that were clustered into four themes: introduction to sustainable consumption, evolution toward sustainable consumption, reduction of consumption, reduction of waste and circular economy.

Throughout the event, the responses of participants were uploaded in real time to a web interface to facilitate cross-national comparisons. This web tool enabled a statistical presentation and comparison of results between countries and also in relation to the entirety of WWViews responses (represented as 'Europe's opinion'). These responses formed the basis for a final policy report written by the DBT, in which nine recommendations were outlined.

Of course, some may consider WWViews to be merely a simple evolution reflecting the need to scale up citizens' participation and thus more efficiently address policy issues that are increasingly supranational. However, we hypothesize that this evolution marks an important shift away from classical public participation methods. Indeed, unlike other methods (e.g. the consensus conference, long considered the hallmark of public participation, see Delvenne, 2017, p. 4), the WWViews method does not offer citizens the possibility to set up the discussion agendas, appraise the opinions of experts, or play an active role in shaping recommendations. With this new procedural format, citizens are no longer active agents under Habermas's notion of debate where 'participants listen to one another, probe their own assumptions, build understanding between various parties and interests and, ideally, through mutual learning and exchange of rational arguments, form a genuine consensus' (Van Bouwel and Van Oudheusden, 2017, p. 7). Instead, they become passive recipients of preselected expert framings, 'empty vessels to be filled with explanations of what [sustainable consumption] really is about' (Rip, 2006, p. 357). Such scientific explanations are communicated prior to the event (via the information booklet) and then reinforced with a short video before each thematic session, rather than being open to contestation or debate.

Furthermore, while consensus conferences or scenario workshops are exemplars of qualitative methodologies, WWViews keeps the qualitative aspect to a minimum: little time is left for deliberation, which in itself only serves as an additional, but peripheral, asset to foster the quality of the process. At the end of each session, participants voted by answering a few multiple-choice questions. Their opinions are thus turned into quantified preferences that are easily transmittable to policy-makers, percentages that can ensure consistency and commensurability across participating countries. These preferences and percentages can then be aggregated and immediately made available online for comparison. As coordinator, DBT paid particular attention to standardizing the design of the event.

In summary, WWViews comes down to three important steps: first, providing participants with relevant information; second, relying on a minimal amount of deliberation; and third, rapidly extracting preferences via a closed questionnaire, the results of which enable cross-national comparisons. This method definitely corresponds to the typical features of 'lab participation' (Bogner, 2012) experiments: the topic of the consultation does not arise from any prior conflict or contestation, recruited participants are not required to have any

pre-existing political interest in the issue they will be consulted on and the consultation occurs in a contained environment employing elaborated and harmonized methodological settings.

It is also worth noting that, as all national citizens consultations were held simultaneously, the only connection with the outside world was a Skype call to another consultation at a given time. Being able to interact briefly with fellow citizens across Europe in real-time gave participants a feeling that they were taking part in a significant event whose borders largely exceeded their own country. This Skype call, however, only served a playful and superficial purpose: nothing was arranged to allow for a proper conversation. Rather, citizens had to remain seated in small groups, just barely able to look at the giant screen to witness the co-presence of their European counterparts. Only a few could shout out a few words in exchange, mostly to joke about the weather.

In fact, formal and informal deliberation was always constrained by a tight schedule. Each step was strictly paced and no spare time was allowed: facilitators were briefed to let the participants know they had to make themselves comfortable, to explain that coffee and water were available by self-service, and to indicate where the restrooms were located because there would be no break at all during the whole day. Even at lunch, a rotation between tables was organized so that each group could quickly get some food and return to the table to keep on deliberating as they ate. In the afternoon, for about 10 min (and still part of the method), the head facilitator invited the participants to stand up for an accelerated class of spinning and stretching together. The class was punctuated by an invitation to each participant to give someone a high five: the participants stuck to their schedule.

## Case 2: Living Labs in Wallonia

The emergence of the ‘Living Lab’ (LL) concept in Europe is more than a decade ago. On 23–24 October 2006, the Finnish Presidency of the European Union organized a conference, held in Helsinki, entitled ‘Networked Business and Government: Something Real for the Lisbon Strategy.’ The motto of that conference was that ‘we need to move fast, before it’s too late.’ The conference’s principle outcome was the so-called ‘Helsinki manifesto,’<sup>4</sup> which outlined seven concrete measures to ‘[turn] the Lisbon Strategy into a living reality and [make] Europe more competitive and innovative in a human-centric way’ (p. 1). One of these measures proposed to ‘renew the European innovation system’ by creating a European-wide network of Living Labs (ENoLL) to foster the development of new experimental spaces ‘through which emerging knowledge-intensive services, businesses, markets, technologies and even industries for jobs and growth can be developed, tested and validated (pp. 3–4).’ The manifesto emphasized that a systematic and organized approach would ensure that common methodologies and tools would be developed across Europe to support,

stimulate, and accelerate the innovation process. At the same time, the initiative was at the centre of strong expectations about regional growth and the development impact, as it was assumed that the increase of LLs in local territories would ‘facilitate and foster regional innovation as interlinked with a European innovation system with a global reach’ (p. 4).

Initially developed to bridge the gap between research and the market, an LL can be described as an open and collaborative innovation process based on three core characteristics: user involvement, experimentation in ‘real-life contexts’ and stakeholders in ‘public-private-people partnerships’ (Dubé *et al.*, 2014). Because it is based on the diversity of participants and a strong focus on the innovation users, the LL network is designed to speed up the innovation process and reduce the risks related to market failure or public backlash with regard to new products. Unlike traditional approaches, where innovation lies in the experience and the creativity of professionals, the LL designers value users’ tacit knowledge to reach an alignment between supply and demand. From this perspective, professionals are considered as experts in technology and a ‘public’ of users (considered as experts in usage) are constructed to provide fresh insights in the innovation process and encourage development of new marketable goods and services. Today, there are approximately 400 LLs recognized by ENoLL throughout the world.

The heart of this case study is one LL located in Wallonia, Belgium. In February 2015, in a widely circulated press release, the Walloon Minister for Economy and Innovation proudly announced that, following the call for projects to anchor LL in Wallonia, he had decided to allocate a €800,000 budget to start a pilot project in the e-Health sector. The Walloon e-Health Living Lab (WeLL) was born, as part of the broader ‘Creative Wallonia’ framework-programme, a regional, specialized initiative geared towards industrial redevelopment through innovation policy measures. The website of the WeLL summarizes its mission as follows: ‘This Living Lab aims to put innovation at the service of citizens, patients, seniors and health actors. By integrating users into the heart of thinking, we anticipate changes and needs in health and ensure better ownership of innovations.’

The inauguration day of the WeLL gathered interested citizens and healthcare professionals who were invited to join a workshop, during which they could leave the role of experimental subjects to become active users, driven by the search for ‘better innovations for better healthcare’ (introduction to the workshops by the WeLL coordinator).

One workshop we observed was dedicated to robotics in healthcare. It was held on 11 February 2015 and took place in the trendy venue of the Liège-based Walloon incubator for techno-entrepreneurs (WSL). Groups of five to six participants, renamed ‘group of users’ for this occasion, were gathered in a large room and led by a general facilitator. Each group was asked to identify a medical problem and to think of ‘an extraordinary robot’ as a corresponding healthcare solution. Each participant was then encouraged to take part in

‘creative brainstorming’ and to respect a singular instruction: to come up with as many ideas as possible, not shying away from expressing far-fetched ideas, ‘even the craziest ones.’ Every idea had to be noted down on a post-it, with ‘one idea per post-it.’ When the time was up, each author was invited to stand up and share what was written on every post-it in front of them. Then, the facilitator collected all post-its, before gluing them to a whiteboard where they were categorized into specific clusters.

When someone wanted to react to an idea expressed by another participant – to discuss its relevance, to stress its potential, or simply to question the assignment – the facilitator intervened immediately to recall forcefully that the brainstorming session’s main purpose was to unleash, rather than hinder, the creative potential of participants. Therefore, no critique or discussion of others people’s ideas was allowed. The participants were informed that the ‘best’ ideas might end up as prototypes for future innovative healthcare solutions but, for the time being, they were to facilitate an inspiring session without expressing negative value judgments. Their involvement ended there: they could ‘add on to’ but not ‘restrain’ the group, and the best way to contribute to the workshop was to focus on maximizing the volume of ideas generated.

### Case 3: ‘Citizens of Wallonia’ Hackathon

The ‘Citizens of Wallonia’ Hackathon took place in the city of Mons, Belgium (9–11 March 2018). Like any other hackathon, ‘Citizens of Wallonia’ consisted of a competition in which participants, grouped in teams, had to create prototypes of functional technological projects within a given period of time following a specific theme. ‘Citizens of Wallonia’ lasted 48 h and invited participants to ‘create new usages thanks to digital technologies and develop solutions to facilitate the life of citizens’ (field notes from the welcome session).

‘Citizens of Wallonia’ was open to anyone, which meant that any interested citizen could register as participant. It was organized by Futurocité, an ‘innovation centre for a citizen-focused future’ that took shape through a partnership between the Walloon Region and private companies such as IBM, Microsoft, and NRB (a Belgian company that specializes in artificial intelligence). The event was organized for the third consecutive year and presented as the biggest hackathon in Wallonia.<sup>5</sup> The 2018 event, on the theme of ‘*Smart Cities*,’ was sponsored by public and private partners. Some sponsors, such as IBM, Proximus Enco, and Wallonie en Poche, offered technological support to participants. The many sponsors meant that no fewer than 10 prizes were awarded at the close of the competition for the categories of: ‘Smart Region,’ ‘Business,’ ‘Pitch,’ ‘Internet of Things,’ ‘Artificial Intelligence,’ ‘Data,’ ‘Citizen Contribution,’ ‘Code,’ ‘Cities,’ and ‘Public.’

During the first evening, participants assembled in teams of two to seven members. A short ‘pitch session’ was organized on the first evening, allowing

participants who had a project in mind to present it to the others in order to recruit potential team members. During 48 h, 17 teams worked hard to develop 17 projects. These participants did so by working exclusively inside a building at the University of Mons; they did their thinking and developed the project there, ate there, and some even slept there (having brought their own mattresses and blankets as invited by the organizers).

The participation time was very loosely structured during the 48 h of the competition with open stretches of time broken by specific timeslots for food breaks (breakfast, lunch and dinner) and training sessions (e.g. Business Model Canvas, pitch techniques, etc.). Due to this open temporal structure, teams were expected to work on their project constantly for 48 h and decide for themselves when they should sleep. Time was indeed a rare commodity during the event. ‘We need to save as much time as possible,’ said one keynote speaker during the welcome session. This perception of time as a scarce resource is perfectly exemplified by the anecdote in the introduction.

The hackathon was explicitly framed as an initiative designed to address major demographic, societal, local, or technological challenges faced by contemporary cities. The Futurocité Director claimed during the closing session: ‘The advent of the Smart Region must come about through the activation of innovation, and that is why we organised Citizens of Wallonia.’ Beginning with the welcome session, participants were addressed as contributors in tackling these challenges facing contemporary cities in the digital age. ‘What are you going to set up to invent tomorrow’s city?’ the organizers asked. What was then expected from participants was the creation of value: ‘It’s not about things, it’s about value’ said a keynote speaker during the welcome session. Participants were invited to focus on their project’s profitability, and its potential benefits for the planet, people, or the economy.

Nonetheless, during the hackathon, a strong emphasis was placed on the projects’ economic profitability. At 10 am on the second day, a training session was organized around the ‘Business Model Canvas’ theme. According to the instructor, this session was aimed at teaching participants ‘how a good idea turns into a good startup.’ The instructor offered his personal definition of a business model, saying, ‘a business model is the best way to make money with your idea.’ During the hackathon, coaches were on-hand to guide teams in their project development. On the afternoon of the second day, a coach visited a group one of our authors had joined, and he scrutinized the business model. He emphasized the need to show that the project was economically viable and invited the team to redirect the project in order to find the competition’s Holy Grail: the Minimum Viable Product (MVP), the most directly profitable product. This MVP was important for the team to find, because later on the same afternoon they had to “pitch” their business model canvas’ to the ‘business jury’ (the jury that would award the ‘business award’ at the competition’s end).



**Table 1.** Co-production of participatory experiments.

	European Wide Views (EWV)	Living Lab	Citizens of Wallonia
HOW (Procedural format)	Citizen consultation Saturday, whole day 1100 Citizens across 11 European countries deliberate and vote on predefined questions at the same time Organizers have no stance on the issue Each round table pre-defined and facilitated by practitioners	Living Lab One creative brainstorming session Self-assembled groups of five to six participants, supervised by one general facilitator Production of as many ideas as possible (no critique, no value judgement) One idea per Post-it	Hackathon From Friday to Sunday, 48 h Self-assembled teams of two to seven participants developing a technological project Each team was supervised by coaches
WHAT (Issue(s) of participatory experiment)	Consumer-oriented regulations and policies to foster sustainable consumption	Robotics innovations for Health-care	Technological projects to reinvent the future of smart cities
WHO (Publics invited to participate)	'Ordinary hybrids' citizen-consumers Role: absorb information, deliberate, and vote	Users, Interested people Role: co-create technological innovations, generate ideas	Any interested citizen Role: co-create technological innovations
WHY (Objectives and value of participatory experiment)	Gauge the acceptability of demand-side regulation/policies for sustainability Allow for better policy decisions at the EU level Tackle the grand challenges (in order to meet sustainable development and economic growth)	Foster inclusive and 'better innovation for better healthcare' Elicit hidden creativity and innovation potential Boost economic growth and redevelopment by quicker marketing of innovations.	Foster technological innovation in order to shape the future of smart cities and develop new services for citizens Elicit hidden creativity and innovation potential Boost economic growth and employment by fostering the creation of technological start-ups

## Accelerating Time, Intensifying Value, and the Shifting Paradigm of Participation

We can now compare our three cases along the four dimensions derived from the co-productionist approach. As previously stated, our approach connects the procedural formats, issues at stake, publics involved and the objectives and values of participatory experiments. The following Table 1 provides a comparative framework to further analyse our cases.

As demonstrated above, the different dimensions of co-production are not independent from each other. Rather, they develop in a relation of mutual dependency. In all the cases we analyzed, each dimension responded to the others and they must each be taken into account to thoroughly examine the participatory experiment.

For the European Wide Views (EWV) case, the objectives of participation and more sustainable regulations and policies corresponded to the consultation's participatory format, which mixed phases of deliberation with phases of voting, and vice versa. That the carefully defined public of the experiment, 'citizen-consumers,' were invited to express opinions without being influenced by activist perspectives, suggests the need to enlighten European policy

debates with so-called 'neutral' citizen' perspectives. All dimensions are thus intrinsically related and reflect the expected political value of the consultation to gauge the acceptability of regulations and policies for sustainability. This view of participation conforms with a broader rationale of enriching decision-making at the EU level in order to tackle the 'grand challenges,' which in turn was conceived as a prerequisite to achieving both sustainable development and economic growth.

For the living-labs (LL) case, the experiment took place in a region, Wallonia, seeking to transform its economy to render it 'creative.' In this context, the LL was conceived as a way to enact creative innovation processes by including users in technological development. The objective of this participatory experiment, based on the participation of 'users' to speed up the marketing of health-care innovation, likewise corresponded to the public authorities tackling e-Health as a strategic innovation policy domain to put the economy back on its feet. The creative brainstorming format incited participants to take an active role in co-creating future technological innovations. This conforms with the organizers' expectation of tapping into the hidden creativity and innovation potential supposedly lying in each participant.

Lastly, the hackathon 'Citizens of Wallonia' also responded to a regional objective of industrial redeployment, but with a specific emphasis on digital innovation and the 'Smart City' idea. Public authorities and the hackathon's organizers formulated their primary objective as boosting economic growth; this was mainly pursued through the creation of digital start-ups. The participatory experiment was conceived purposefully as very encompassing, addressed to any interested citizen, sought as a potential future entrepreneur. This fabricated public was subsequently invited to reflect on the premise of inventing 'smarter' cities via technological means. The playful format of a participatory competition aimed at rapidly eliciting the participants' creativity and productivity in a confined environment, where they could be trained by coaches to develop profitable business models.

As a sensitizing idiom, our co-productionist approach takes into account the asymmetries of power and the structural effects of the four dimensions we outlined. By connecting participatory experiments to the political-economic spaces in which they are valued, we are led to recognize how participation can be subject to broader political agendas. Our analysis suggests that the evolution of participation reflects, and deepens, participation driven by instrumental (and mostly economic) outcomes. A growing emphasis on the need to generate economic growth through innovation tends to generate appropriate formats for this purpose. In addition, participation in itself becomes less and less a matter of argued deliberation and increasingly an issue of expressing one's own preferences or individual ideas in order to create outcomes mostly valuable to political or economic actors.

Despite their divergence along the four dimensions we outlined, the three cases show similarities in terms of organization. Indeed, they were all organized

by dedicated professionals and institutions, whether public or private entities. They were enacted within contained environments: specific buildings isolating the processes from the rest of the world, even for the LL project that was supposed to happen in ‘real-world conditions.’ They were subjected to sophisticated methodological settings: the elaborate methodology of a cross-European citizen consultation, the early phases of co-created innovation process of a LL, or the supervised development of emerging technological projects in a hackathon.

Our three examples of participatory experimentation were conducted in strikingly similar ways. They all had a dual trend of acceleration and intensification. *Acceleration* means that participatory experiments are increasingly organized as intense events where time is considered a scarce commodity. From the EWVs participants lunching while debating, to the WeLL’s workshop participants urged to be creative immediately without any prior information or deliberation, to the participants of Citizens of Wallonia sleeping four hours a night on their workroom floor, time is maximally utilized to optimize participation. The notion of optimization is crucial as it highlights the fact that less time is dedicated to participation in absolute terms (and within such time, an ever-slimmer part is devoted to deliberation). Events seem designed to dedicate any miniscule amount of time to participation despite their brevity: one single day for EWVs, a few hours for the LL workshop, 48 h for the ‘Citizens of Wallonia’ hackathon.

*Intensification* means that participatory experiments often seek to extract as much value as possible from their participants. This value might consist of citizen preferences quantitatively expressed for the EWV consultation; ‘crazy’ ideas for the development of robotics technology during the Living Lab workshop; or even concrete technological projects and minimum viable products at the ‘Citizens of Wallonia’ hackathon.

The accelerating time and intensifying value are not only discursive constraints repeated by the organizers, they are also rooted in the design of participatory experiments and internalized by the participants. Recent scholarship emphasizes the importance of the material conditions specifically tailored to the requirements for participatory action (Marres and Lezaun, 2011; Lodato and DiSalvo, 2016; Lezaun *et al.*, 2017). Our cases show to what extent the material aspects of participation were thought, designed and structured. From the EWVs’ disposition of maximum 7-person round tables in one single big room where lunch was served, to the use of post-its as a vehicle for expressing creativity in self-assembled groups gathered in the same room, to the organization of a hackathon in a single building where participants could sleep, eat, and of course make their projects ‘grow.’ Any time available is used to unleash and exploit the participants’ potential (be it discursive or creative).

Our findings also reveal a strong commitment by facilitators and coaches to motivate participants to provide ever more valuable preferences, ideas, and energy to develop projects. To some extent, facilitators and coaches also

served to redirect participation toward political-economic value creation. In the case of EWVs, for example, they were asked to act in order to avoid conflict during the debates. In the LL workshop, negative value judgement or unproductive questions were simply not allowed. During the hackathon, coaches would point to specific caveats of the projects and training sessions were programmed, for example, to direct the participants' attention to their project's economic profitability.

Overall, our three cases reveal the maximization of quantitatively measured outputs. Based on this diagnosis, we argue that what is at play here is a shifting paradigm in the democratic order in which varied experimental participatory practices are deployed. The emerging participatory experiments *no longer reflect the importance of public participation and the democratization of expertise* (the so-called 'participatory turn' that was studied by so many STS scholars). This shifting paradigm indicates a relative abandonment of concerns related to democratization, as well as a radical redefinition of what is political in participatory experiments. Publics are expected to act as innovators and entrepreneurs, and the common good is redefined accordingly.

The fact that participatory experiments are often increasingly detached from conflicts, controversies, or political issues supports the idea that the experimental community's intended purpose no longer includes engaging in polarized debates. Rather, the agency of the experimental community is mostly limited to demonstrating that the method can work (Bogner, 2012), and that one can rapidly extract relevant and valuable data from the participatory experiment.

This point is exemplified by the absence of conflict in our cases. The only case where a limited conflict emerged was that of EWVs where a small minority of participants violated the rules of the experiment by refusing to conform to the standardized format of the questionnaire. This small minority exerted their agency to interrogate the normative and methodological assumptions of the questionnaire's questions. However, even when it drew the attention of the organizers, such non-compliant behaviour was ignored and thus rendered the vote null. Other participants voted as expected, but they expressed their doubts or disagreements by writing up their impressions directly on the questionnaire. The process of information-deliberation-vote was thoroughly reproduced from one session to the other. Over time, facilitators reported mounting frustration and dissatisfaction about the procedure, which prevented participants from having an open conversation and talking to anyone else apart from the 8–9 others seated at their table.

As it was deemed crucial to keep the citizens happy in order to make the participatory experiment a success, the organizers decided to break the rules and included a plenary session at the end of the day, just before circulating the evaluation questionnaire. At this occasion, several participants questioned the assumptions embedded in the 'grand challenge,' believing that there was a mismatch between sustainable consumption and the current political-economic

system's desire for growth. In the case of the LL workshop, the only sign of resistance was eliminating deliberation time: non-compliant participants chose not to engage with the objective of producing as many ideas as possible, and deliberately left some post-its blank or just sat back.

This shows that the more time is dedicated to open debates, the more subversive agency (conflict or dissent) is likely to arise, and the more this is likely to impact the accelerating time and intensifying value. When the participatory experiment is so strictly designed and conducted or so disconnected to any political issue, as in the cases of LL and Citizens of Wallonia, there is just no space for conflict to be voiced. To be sure, allowing more time for open debate is not what cultivates dissent, but rather the pre-determined structure of the participatory experiments that cultivates dissent; allowing more time for open debates merely offers the possibility to voice these concerns, but does not cause them.

If participation is no longer concerned with the democratization of policy-making processes or with the way the quality of deliberation encourages the best argument to surface (as Habermas's ideal would put it), then why is it organized? What is the value of these experiments? Where is the shifting paradigm going?

Our analysis suggests that contemporary participatory experiments, in their diverse forms, are primarily directed toward extracting value from participants for instrumental use: political aggregation for comparative purposes among the constructed European 'public' (EWVs), marketing of user-informed innovations (LL), or early and rapid marketing of innovations (LL, CoW). Even though this does not imply that no policy issues are at stake anymore, the aim of democratizing expertise seems much less relevant than that of creating economic value. Our empirical findings suggest that participation is intended to foster innovation and is submitted to a broader political agenda of competitiveness and the knowledge economy. When looking at the forms of participation promoted in this agenda, what we witness is a gradual shift from civic values (an appeal to democratic ideals) to productivist values (a utilitarian vision of participation that serves to produce primarily economic value).

## Conclusion

In this paper, we adopted a co-productionist approach to examine the current evolution of participatory experiments in science, technology, and innovation. Our aim was to understand the mutual shaping of current participatory experiment modes with wider political-economic ordering.

We presented a comparative analysis of three participatory experiments, selected for their diversity of scales, forms, issues, publics, objectives and forms of value. By highlighting the similarities we observed across the three cases, we argued that participatory experiments are currently shaped by a double trend of accelerating time and intensifying value. This trend indicates

a broader shift in the way participation is conceived, designed and implemented. It goes without saying that if participatory experiments always entail ‘intense effort (...) in making collective participatory practices work,’ these are fragile and ‘can and do often fail’ and ‘there will always be resistances’ (Chilvers and Kearnes, 2016a, p. 46).

Yet our findings suggest something more: namely, that the organization of participatory experiments responds to broader imperatives from powerful actors. In our cases, the European Commission, the Ministry for Economy and Innovation, and private companies were each pursuing political-economic agendas of economic competitiveness and the knowledge economy. This asymmetrical exercise of power by institutions over individuals turns these participatory experiments into processes that accelerate time and intensify economic value creation. As we have shown, these participatory experiments may trigger multiple forms of agency. On the one hand, these processes lead to the enactment of participants’ agency as creativity. Yet, on the other hand, when participants or organizers become frustrated or dissatisfied with the organizational conditions, a more subversive agency may undermine the expected results of the experiment.

The title of this article suggests that such trends have ‘broken bad’ with the participatory turn as originally envisaged by STS scholarship at the turn of the millennium. Conventional approaches to participatory experiments have been challenged and reimagined. We have shown how experimental practices of participation increasingly seeks complex instruments to demonstrate that the experiment works, while taming uncertainty and conflict through largely controlled experimental forms of life.

In addition to the colloquial meaning of the phrase ‘breaking bad,’ that is, challenging convention, the double entendre has literal meanings. In particular, co-productionist understandings of participation have sought to shape practices and influence technological development, for instance through ‘distributed governance’ (Barben *et al.*, 2008), ‘midstream modulation’ (Fisher *et al.*, 2006), ‘experimental intervention’ (Lezaun *et al.*, 2017) or long-standing approaches like ‘constructive or real-time technology assessment’ (Guston and Sarewitz, 2002; Rip and te Kulve, 2008). Such understandings run the risk of co-option and instrumental use for political-economic purposes that remain largely unquestioned (Joly, 2015).

Because these co-productionist analyses avoid political questioning of the objectives of participation, they tend to conceal the asymmetries of power and resource distribution that affect, and are being affected by, participatory experiments. Thus, in stark contrast to earlier STS concerns, such as democratizing expertise or politicizing technology issues, current understandings of participation run the risk of ‘breaking bad’ with the early spirit of the participatory turn; they may contribute to political changes that reshape participation-as-we-knew-it.

The shifting paradigm of participation therefore has important consequences for the STS community if it does not want to diminish the influence of its initial radical perspectives on technologies in society (Thoreau and Delvenne, 2012, p. 221). First, the shift should motivate us to critically analyse the recently emerging practices of participation. We should be sceptical of collective experiments promoted and organized by public authorities, often partnering with private actors, that retreat into insulated deliberative spaces where technologies are tested or developed. Such experiments warrant critical scrutiny. Second, there is a need to re-interrogate linkages between science, technology, and democracy in and across different political systems; although our case studies concern the European Commission and the Walloon Region, the analysis might be similar or different in other political spaces.

At stake is whether the acceleration of time and intensification of value in participatory experiments diminishes space for collective forms of imagining plural sociotechnical futures (Felt *et al.*, 2013, p. 17). This trend warrants a critical response from STS scholars in order to defend the civic values of democratizing technologies and policy-making processes.

## Notes

1. We were involved as a full member of this project's consortium. See the website: [www.pacitaproject.eu](http://pacitaproject.eu).
2. Because the scale of the PACITA project was European, the method was renamed 'European Wide Views' but the rationale and structure of the method was exactly the same.
3. <https://easst.net/easst-review/easst-review-volume-311-march-2012/a-pioneer-in-trouble-danish-board-of-technology-are-facing-problems/>.
4. [http://elivinglab.org/files/Helsinki\\_Manifesto\\_201106.pdf](http://elivinglab.org/files/Helsinki_Manifesto_201106.pdf).
5. <http://www.citizensofwallonia.be/>.

## Disclosure Statement

No potential conflict of interest was reported by the authors.

## Funding

This work was supported by Fonds De La Recherche Scientifique - FNRS.

## Notes on contributors

*Pierre Delvenne* holds a PhD in Political and Social Sciences of the University of Liège. He is Research Associate of the National Fund for Scientific Research (permanent research position) and Lecturer at the University of Liège (Department of Political Science). In Liège, Pierre serves as the Co-Director of Spiral Research Centre (STS) and the Director of Cité interdisciplinary research unit. He has published extensively in his areas of expertise:



Technology Assessment, bioeconomy in Europe and Latin America, and more broadly, science and technology in society. Pierre is also a founding member of the Belgian Network for Science and Technology in Studies (BSTS).

**Hadrien Macq** is PhD Candidate in Political and Social Sciences. He holds a Master of Arts in European Studies on Science, Society and Technology of the University of Maastricht as well as a Master's degree in Political Science of the University of Liège. Through his PhD research, he analyses the emergence of institutionally sponsored public participation in knowledge and innovation-making at the European and the Walloon levels.

## References

- Barben, D., Fisher, E., Selin, C. and Guston, D. H. (2008) Anticipatory governance of nanotechnology: Foresight, engagement and integration, in: E. J. Hackett, O. Amsterdamska, M. Lynch and J. Wacjman (Eds) *The Handbook of Science and Technology Studies: Third Edition*, pp. 979–1000 (Cambridge: MIT Press).
- Barry, A. (2001) *Political Machines: Governing a Technological Society* (London: The Athlone Press).
- Bedsted, B., Gram, S. and Klüver, L. (2012) The story of WWViews, in: M. Rask, R. Worthington and M. Lammi (Eds) *Citizen Participation in Global Environment Governance*, pp. 30–44 (London and New York: Earthscan).
- Berg, B.-L. and Lune, H. (2011) *Qualitative Research Methods for the Social Sciences* (Essex: Pearson Education).
- Blue, G. and Medlock, J. (2014) Public engagement with climate change as scientific citizenship: A case study of world wide views on global warming, *Science as Culture*, 23(4), pp. 560–579.
- Bogner, A. (2012) The paradox of participation experiments, *Science, Technology, & Human Values*, 37(5), pp. 506–527.
- Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology, *Qualitative Research in Psychology*, 3(2), pp. 77–101.
- Chilvers, J. and Kearnes, M. (2016a) Participation in the making: Rethinking public engagement in co-productionist terms, in: J. Chilvers and M. Kearnes (Eds) *Remaking Participation: Science, Environment and Emergent Publics*, pp. 31–63 (Oxon: Routledge).
- Chilvers, J. and Kearnes, M. (2016b) *Remaking Participation. Science, Environment and Emergent Publics* (Oxon: Routledge).
- Chilvers, J. and Longhurst, N. (2016) Participation in transition(s): Reconceiving public engagements in energy transitions as co-produced, emergent and diverse, *Journal of Environmental Policy & Planning*, 18(5), pp. 1–23.
- Delvenne, P. (2017) Responsible research and innovation as a travesty of technology assessment?, *Journal of Responsible Innovation*, 4(2), pp. 278–288.
- Dubé, P., Sarrailh, J., Billebaud, C., Grillet, C., Zingraff, V. and Kostecki, I. (2014) *Le livre blanc des Living Labs*.
- Felt, U. and Fochler, M. (2010) Machineries for making publics: Inscribing and de-scribing publics in public engagement, *Minerva*, 48(3), pp. 219–238.
- Felt, U., Barben, D., Irwin, A., Joly, P.-B., Rip, A., Stirling, A. and Stöckelová, T. (2013) *Science in Society: Caring for our Futures in Turbulent Times* (Strasbourg: European Science Foundation).
- Fischer, F. (2003) *Reframing Public Policy: Discursive Politics and Deliberative Practices* (Oxford: Oxford University Press).

- Fisher, E., Mahajan, R. and Mitcham, C. (2006) Midstream modulation of technology: Governance from within, *Bulletin of Science, Technology & Society*, 26(6), pp. 485–496.
- Goven, J. (2006) Dialogue, governance, and biotechnology: Acknowledging the context of the conversation, *Integrated Assessment*, 6(2), pp. 99–116.
- Guston, D. H. and Sarewitz, D. (2002) Real-time technology assessment, *Technology in Society*, 24, pp. 93–109.
- Irwin, A. (2001) Constructing the scientific citizen: Science and democracy in the biosciences, *Public Understanding of Science*, 10(1), pp. 1–18.
- Jasanoff, S. (2003) Technologies of humility: Citizen participation in governing science, *Minerva*, 41, pp. 223–244.
- Jasanoff, S. (Ed.). (2004) *States of Knowledge: The Co-Production of Science and the Social Order* (London: Routledge).
- Jasanoff, S. (2011) Constitutional moments in governing science and technology, *Science and Engineering Ethics*, 17(4), pp. 621–638.
- Johnston, J. (2008) The citizen-consumer hybrid: Ideological tensions and the case of whole foods market, *Theory and Society*, 37(3), pp. 229–270.
- Joly, P.-B. (2015) Governing emerging technologies? The need to think outside the (black) box, in: S. Hilgartner, C. A. Miller and R. Hagendijk (Eds) *Science and Democracy. Making Knowledge and Making Power in the Biosciences and Beyond*, pp. 133–155 (New York: Routledge).
- Jørgensen, M. L., Kozarev, V. and Juul, K. L. (2016) European wide views on sustainable consumption, in: L. Klüver, R. Oyvind Nielsen and M. L. Jørgensen (Eds) *Policy-oriented Technology Assessment across Europe*, pp. 114–124 (London: Palgrave Macmillan).
- Kaldewey, D. (2018) The grand challenges discourse: Transforming identity work in science and science policy, *Minerva*, 56(2), pp. 161–182.
- Laurent, B. (2011) Technologies of democracy: Experiments and demonstrations, *Science and Engineering Ethics*, 17(4), pp. 649–666.
- Laurent, B. (2016) Political experiments that matter: Ordering democracy from experimental sites, *Social Studies of Science*, 46(5), pp. 773–794.
- Laurent, B. (2017) *Democratic Experiments: Problematizing Nanotechnology and Democracy in Europe and the United States* (Cambridge, MA: MIT Press).
- Lezaun, J. (2011) Offshore democracy: Launch and landfall of a socio-technical experiment, *Economy and Society*, 40(4), pp. 553–581.
- Lezaun, J., Marres, N. and Tironi, M. (2017) Experiments in participation, in: U. Felt, R. Fouché, C. A. Miller, and L. Smith-Doerr (Eds) *The Handbook of Science and Technology Studies: Fourth Edition*, pp. 195–221 (Cambridge, MA: MIT Press).
- Lodato, T. J. and DiSalvo, C. (2016) Issue-oriented hackathons as material participation, *New Media & Society*, 18(4), pp. 539–557.
- Macq, H., Tancoigne, E. and Strasser, B. (submitted for publication) From deliberation to production. The many lives of public participation in science at the European commission, *Minerva*.
- Marres, N. (2005) No issue, no public: Democratic deficits and the displacement of politics, Doctoral dissertation, University of Amsterdam, Amsterdam.
- Marres, N. (2012) *Material Participation: Technology, the Environment and Everyday Publics* (London: Palgrave Macmillan).
- Marres, N. and Lezaun, J. (2011) Materials and devices of the public: An introduction, *Economy and Society*, 40(4), pp. 489–509.
- PACITA (2010) Part B. Project proposal: Parliaments and civil society in technology assessment. Coordination and support action (supporting) SiS-2010 1,0-1 Mobilisation and Mutual Learning Actions. 7th Framework Programme, European Commission.

- PACITA (2014) Available at [http://citizenconsultation.pacitaproject.eu/wp-content/uploads/2014/10/PACITA\\_Booklet\\_International\\_WEB.pdf](http://citizenconsultation.pacitaproject.eu/wp-content/uploads/2014/10/PACITA_Booklet_International_WEB.pdf).
- Parotte, C. (2018) *L'Art de gouverner les déchets hautement radioactifs. Analyse comparée de la Belgique, la France et le Canada* (Liège: Presses universitaires de Liège).
- Rip, A. (2006) A co-evolutionary approach to reflexive governance—and its ironies, in: J.-P. Voss, D. Bauknecht and R. Kemp (Eds) *Reflexive Governance for Sustainable Development*, pp. 82–100 (Cheltenham: Edward Elgar).
- Rip, A. and te Kulve, H. (2008) Constructive technology assessment and socio-technical scenarios, in: E. Fisher, C. Selin and J. Wetmore (Eds) *The Yearbook of Nanotechnology in Society, Volume 1: Presenting Futures*, pp. 49–70 (Berlin: Springer).
- Sum, N.-L. and Jessop, B. (2013) *Towards a Cultural Political Economy: Putting Culture in its Place in Political Economy* (Cheltenham: Edward Elgar).
- Thoreau, F. and Delvenne, P. (2012) Have STS fallen into a political void? Depoliticisation and engagement in the case of nanotechnologies, *Política e Sociedade*, 11(20), pp. 205–226.
- Thorpe, C. (2010) Participation as post-fordist politics: Demos, new labour, and science policy, *Minerva*, 48(4), pp. 389–411.
- Tong, A., Sainsbury, P. and Craig, J. (2007) Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups, *International Journal for Quality in Health Care*, 19(6), pp. 349–357.
- Van Bouwel, J. and Van Oudheusden, M. (2017) Participation beyond consensus? Technology assessments, consensus conferences and democratic modulation, *Social Epistemology*, 31(6), pp. 497–513.
- Voss, J.-P. and Amelung, N. (2016) Innovating public participation methods: Technoscientization and reflexive engagement, *Social Studies of Science*, 46(5), pp. 749–772.
- Wynne, B. (2006) Public engagement as a means of restoring public trust in science – hitting the notes, but missing the music?, *Public Health Genomics*, 9(3), pp. 211–220.